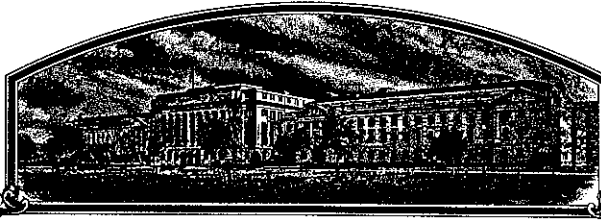


No.

8500038



THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Holden's Foundation Seeds, Inc.

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF *eighteen* YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT T. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

CORN

'LH93'

In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D. C. this 31st day of March in the year of our Lord one thousand nine hundred and eighty-six.

Attest

Kenneth H. ...

Commissioner

Plant Variety Protection Office
Agricultural Marketing Service

Richard E. Lyng
Secretary of Agriculture

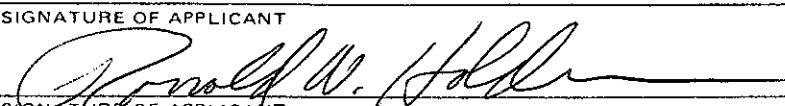
U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

FORM APPROVED: OMB NO. 0581-0055

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

(Instructions on reverse)

1. NAME OF APPLICANT(S) Holden's Foundation Seeds, Inc.		2. TEMPORARY DESIGNATION Ex828		3. VARIETY NAME LH93	
4. ADDRESS (Street and No. or R.F.D. No., City, State, and Zip Code) R.R. #2, Box 839 Williamsburg, Iowa 52361		5. PHONE (Include area code) 319-668-1100		FOR OFFICIAL USE ONLY PVPO NUMBER 8500038	
6. GENUS AND SPECIES NAME Zea Mays		7. FAMILY NAME (Botanical) Gramineae		FILING DATE 1/11/85 TIME 2:30 <input type="checkbox"/> A.M. <input checked="" type="checkbox"/> P.M.	
8. KIND NAME Field Corn		9. DATE OF DETERMINATION November 1982		FEES RECEIVED AMOUNT FOR FILING \$ 1,800 DATE 1/11/85 AMOUNT FOR CERTIFICATE \$ DATE	
10. IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM OF ORGANIZATION (Corporation, partnership, association, etc.) Corporation					
11. IF INCORPORATED, GIVE STATE OF INCORPORATION Iowa				12. DATE OF INCORPORATION 1968	
13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS Mark Armstrong P.O. Box 839 Williamsburg, Iowa 52361 PHONE (Include area code): 319-668-1100					
14. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED a. <input checked="" type="checkbox"/> Exhibit A, Origin and Breeding History of the Variety (See Section 52 of the Plant Variety Protection Act.) b. <input checked="" type="checkbox"/> Exhibit B, Novelty Statement. c. <input checked="" type="checkbox"/> Exhibit C, Objective Description of Variety (Request form from Plant Variety Protection Office.) d. <input checked="" type="checkbox"/> Exhibit D, Additional Description of Variety. e. <input checked="" type="checkbox"/> Exhibit E, Statement of the Basis of Applicant's Ownership.					
15. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? (See Section 83(a) of the Plant Variety Protection Act.) <input type="checkbox"/> Yes (If "Yes," answer items 16 and 17 below) <input checked="" type="checkbox"/> No					
16. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			17. IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED? <input type="checkbox"/> Foundation <input type="checkbox"/> Registered <input type="checkbox"/> Certified		
18. DID THE APPLICANT(S) PREVIOUSLY FILE FOR PROTECTION OF THE VARIETY IN THE U.S.? <input type="checkbox"/> Yes (If "Yes," give date) <input checked="" type="checkbox"/> No					
19. HAS THE VARIETY BEEN RELEASED, OFFERED FOR SALE, OR MARKETING IN THE U.S. OR OTHER COUNTRIES? <input type="checkbox"/> Yes (If "Yes," give names of countries and dates) <input checked="" type="checkbox"/> No					
20. The applicant(s) declare(s) that a viable sample of basic seeds of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable. The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in Section 41, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act. Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.					
SIGNATURE OF APPLICANT 				DATE 1/3/85	
SIGNATURE OF APPLICANT				DATE	

'LH93' was developed through a pedigreed system of breeding. On the following page is a schematic description of the development of 'LH93'. [Also included are copies of pages from Holden's Foundation Seeds nursery books. The rows associated with the development of 'LH93' have been highlighted.]

NOT MADE PART OF THE CERTIFICATE - R/S

Attached is a statement from the originating plant breeder, Art Johnson, Holden's Foundation Seeds, stating that the line is uniform, stable and free of variance within the population.

The seed that was used for initiating this breeding project was obtained from Iowa State University.

Uniformity Statement

I observed 'LH93' during the three generations it has been increased, Iowa nursery row, 11718, Hawaii nursery rows, 8872-8891 and Iowa West Homestead field 1984. In each of the increases the seeds from the previous generation were planted. The line is very stable, uniform and free of variance within the population.

Art Johnson
Plant Breeder

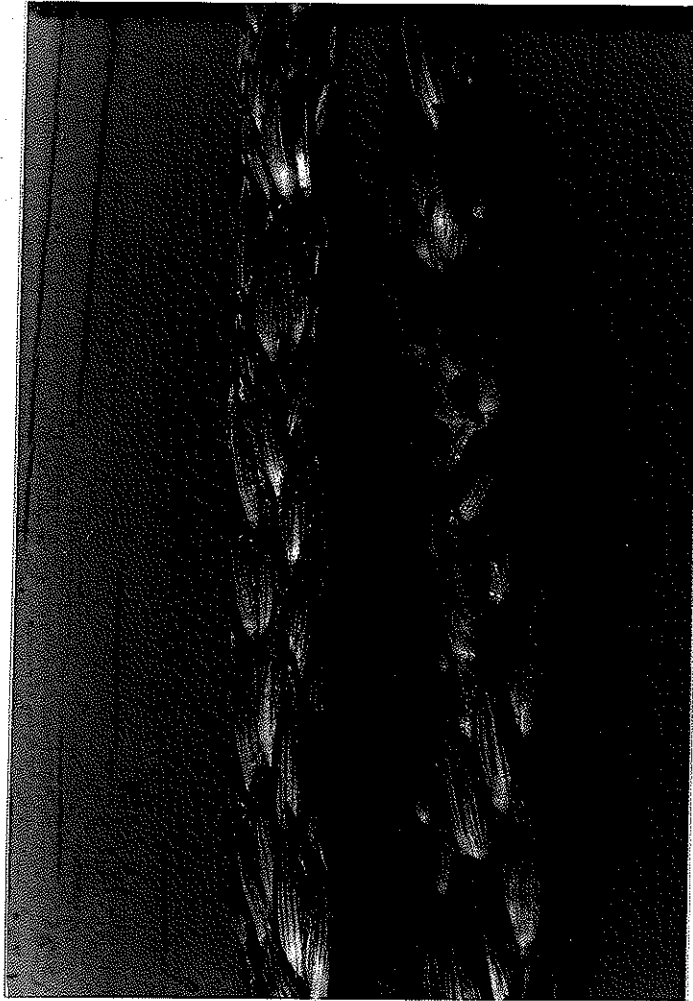
Exhibit A

Origin and Breeding History of the Variety
LH93=Ex828=BS11 FRC3

<u>Row No.</u>	<u>Pedigree</u>	<u>Location</u>	<u>Year</u>
18193	BS11 FRC3	Iowa	1977
3020	BS11	Hawaii	1978-79
16544	BS11	Iowa	1979
4543	BS11	Hawaii	1979-80
20629	BS11	Iowa	1980
2286	BS11	Iowa	1981
8635	BS11	Hawaii	1981-82
11718	BS11	Iowa	1982
8872-8891	Ex828	Hawaii	1983-84
West Homestead (Sandwich Shop)	LH93	Iowa	1984

Exhibit B

'LH93' most closely resembles 'B77'; however, the most distinguishing characteristic is the glume on the tassel. The 'LH93' glume is green with a brown margin while the 'B77' glume is green with a purple margin. This is illustrated in the photograph below.



Photograph 1

The central spike of the 'LH93' tassel is on the left. Notice the brown margin on the glume. Using the Munsell Color Charts for Plant Tissues as a reference the margin color is classified as 5YR 6/8. The central spike of the 'B77' tassel is on the right and it is a purple color that would be classified as 5RP 4/8.

OBJECTIVE DESCRIPTION OF VARIETY
CORN (ZEA MAYS)

NAME OF APPLICANT(S)

Holden's Foundation Seeds, Inc.

ADDRESS (Street and No. or R.F.D. No., City, State, and ZIP Code)

R.R. #2, Box 839
Williamsburg, Iowa 52361

FOR OFFICIAL USE ONLY

PVPO NUMBER

8500038

VARIETY NAME OR TEMPORARY
DESIGNATION

LH93 r/s

Place the appropriate number that describes the varietal character of this variety in the boxes below.
Place a zero in first box (e.g., 089 or 09) when number is either 99 or less or 9 or less.

1. TYPE:

2

1 = SWEET

2 = DENT

3 = FLINT

4 = FLOUR

5 = POP

6 = ORNAMENTAL

2. REGION WHERE BEST ADAPTED IN THE U.S.A.:

7

1 = NORTHWEST

2 = NORTHCENTRAL

3 = NORTHEAST

4 = SOUTHEAST

5 = SOUTHCENTRAL

6 = SOUTHWEST

7 = MOST REGIONS

3. MATURITY (In Region of Best Adaptability):

(Under "comments" (pg. 3) state how
heat units were calculated)

79

DAYS FROM EMERGENCE TO 50% OF PLANTS IN SILK

1554

HEAT UNITS

00

DAYS FROM 50% SILK TO OPTIMUM EDIBLE QUALITY

0000

HEAT UNITS

00

DAYS FROM 50% SILK TO HARVEST AT 25% KERNEL MOISTURE

0000

HEAT UNITS

4. PLANT:

217

CM. HEIGHT (To tassel tip)

096

CM. EAR HEIGHT (To base of top ear)

15

CM. LENGTH OF TOP EAR INTERNODE

Number of Tillers:

1

1 = NONE

2 = 1-2

3 = 2-3

4 = > 3

Number of Ears Per Stalk:

3

1 = SINGLE

2 = SLIGHT TWO-EAR TENDENCY

3 = STRONG TWO-EAR TENDENCY 4 = THREE-EAR TENDENCY

Cytoplasm Type:

5

1 = NORMAL

2 = "T"

3 = "S"

4 = "C"

5 = OTHER (Specify) Untested and unknown

5. LEAF (Field Corn Inbred Examples Given):

Color: 5GY 4/6 Munsell Color Charts for Plant Tissues

1

1 = LIGHT GREEN (HY)

2 = MEDIUM GREEN (WF9)

3 = DARK GREEN (B14)

4 = VERY DARK GREEN (K166)

Angle from Stalk (Upper half):

2

1 = < 30°

2 = 30-60°

3 = > 60°

Sheath Pubescence:

2

1 = LIGHT (W22)

2 = MEDIUM (WF9)

3 = HEAVY (OH26)

Marginal Waves:

2

1 = NONE (HY)

2 = FEW (WF9)

3 = MANY (OH7L)

Longitudinal Creases:

2

1 = ABSENT (OH51)

2 = FEW (OH56A)

3 = MANY (PA11)

Width:

10

CM. WIDEST POINT OF EAR NODE LEAF

Length:

069

CM. EAR NODE LEAF

11

NUMBER OF LEAVES PER MATURE PLANT

6. TASSEL:

0 8

NUMBER OF LATERAL BRANCHES

8500038

Branch Angle from Central Spike:

2

1 = < 30°

2 = 30-40°

3 = > 45°

Penduncle Length:

0 9

CM. FROM TOP LEAF TO BASAL BRANCHES

Pollen Shed:

2

1 = LIGHT (WF9)

2 = MEDIUM

3 = HEAVY (KY21)

2

Anther Color:

1 = YELLOW

2 = PINK

3 = RED

4 = PURPLE

5 = GREEN

6

Glume Color:

6 = OTHER (Specify)

green w/brown margin

Pollen Restoration for Cytoplasm (0 = Not Tested, 1 = Partial, 2 = Good)

0

"T"

0

"S"

0

"C"

0

OTHER (Specify Cytoplasm and degrees of restoration)

7. EAR (Husked Ear Data Except When Stated Otherwise):

1 6

CM LENGTH

3 2

MM. MID-POINT
DIAMETER

8 3

GM. WEIGHT

Kernel Rows:

2

1 = INDISTINCT

2 = DISTINCT

1 4

NUMBER

1

1 = STRAIGHT

2 = SLIGHTLY CURVED

3 = SPIRAL

Silk Color (Exposed at Silking Stage):

1

1 = GREEN

2 = PINK

3 = SALMON

4 = RED

Husk Color:

1

FRESH

1 = LIGHT GREEN

2 = DARK GREEN

3 = PINK

6

DRY

4 = RED

5 = PURPLE

6 = BUFF

Husk Extention: (Harvest Stage)

2

1 = SHORT (Ears Exposed) 2 = MEDIUM (Barely Covering Ear)

3 = LONG (8-10CM Beyond Ear Tip)

4 = VERY LONG (> 10 CM)

Husk Leaf:

1

1 = SHORT (< 8 CM)

2 = MEDIUM (8-15 CM)

3 = LONG (> 15 CM)

Shank:

0 8

CM LONG

7

NO. OF INTERNODES

Position at Dry Husk Stage:

3

1 = UPRIGHT

2 = HORIZONTAL

3 = PENDENT

Taper:

1

1 = SLIGHT

2 = AVERAGE

3 = EXTREME

Drying Time (Unhusked Ear):

2

1 = SLOW

2 = AVERAGE

3 = FAST

8. KERNEL (Dried):

Size (From Ear Mid-Point):

1 1

MM LONG

0 7

MM. WIDE

0 5

MM. THICK

Shape Grade (% Rounds)

2

1 = < 20

2 = 20-40

3 = 40-60

4 = 60-80

5 = > 80

8. KERNEL (Dried) :

Pericarp Color: 1 = COLORLESS 2 = RED-WHITE CROWN 3 = TAN 4 = BRONZE
 5 = BROWN 6 = LIGHT RED 7 = CHERRY RED
 8 = VARIEGATED (Describe) _____

Aleurone Color: 1 = HOMOZYGOUS 2 = SEGREGATING (Describe) _____

1 = WHITE 2 = PINK 3 = TAN 4 = BROWN 5 = BRONZE 6 = RED
 7 = PURPLE 8 = PALE PURPLE 9 = VARIEGATED (Describe) _____

Endosperm Color: 1 = WHITE 2 = PALE YELLOW 3 = YELLOW 4 = PINK-ORANGE 5 = WHITE CAP.

Endosperm Type:

1 = SWEET (su1) 2 = EXTRA SWEET (sh2) 3 = NORMAL STARCH 4 = HIGH AMYLOSE STARCH
 5 = WAXY STARCH 6 = HIGH PROTEIN 7 = HIGH LYSINE 8 = OTHER (Specify) _____

GM. WEIGHT /100 SEEDS (Unsize Sample)

9. COB:

MM. DIAMETER AT MID-POINT

Strength:

1 = WEAK 2 = STRONG

Color:

1 = WHITE 2 = PINK 3 = RED 4 = BROWN
 5 = VARIEGATED 6 OTHER (Specify) _____

10. DISEASE RESISTANCE (0 = Not Tested, 1 = Susceptible, 2 = Resistant):

<input type="text" value="0"/> STALK ROT (Diplodia)	<input type="text" value="0"/> STALK ROT (Fusarium)	<input type="text" value="0"/> STALK ROT (Gibberella)
<input type="text" value="1"/> NORTHERN LEAF BLIGHT	<input type="text" value="0"/> SOUTHERN LEAF BLIGHT	<input type="text" value="0"/> SMUT
<input type="text" value="0"/> SOUTHERN RUST	<input type="text" value="0"/> CORN SMUT	<input type="text" value="0"/> BACTERIAL WILT
<input type="text" value="0"/> BACTERIAL LEAF BLIGHT	<input type="text" value="0"/> MAIZE DWARF MOSAIC	<input type="text" value="0"/> STUNT
<input type="text" value="0"/> OTHER (Specify) _____		

11. INSECT RESISTANCE (0 = Not Tested, 1 = Susceptible, 2 = Resistant):

<input type="text" value="0"/> CORNBORER	<input type="text" value="0"/> EARWORM	<input type="text" value="0"/> SAPBEETLE	<input type="text" value="0"/> APHID
<input type="text" value="0"/> ROOTWORM (Northern)	<input type="text" value="0"/> ROOTWORM (Western)		
<input type="text" value="0"/> ROOTWORM (Southern)	<input type="text" value="0"/> OTHER (Specify) _____		

12. VARIETIES MOST CLOSELY RESEMBLING THAT SUBMITTED FOR THE CHARACTERS GIVEN:

CHARACTER	VARIETY	CHARACTER	VARIETY
Maturity	Mo17Ht	Kernel Type	-
Plant Type	B77	Quality (Edible)	-
Ear Type	-	Usage	-

REFERENCES:

U.S. Department Agriculture. Yearbook 1937.
 Corn: Culture, Processing, Products. 1970 Avi Publishing Company, Westport, Connecticut. (Numerous Authors)
 Emerson, R.A., G.W. Beadle, and A.C. Fraser. A Summary of Linkage Studies in Maize. Cornell A.E.S., Mem. 180. 1935.
 The Mutants of Maize. 1968. Crop Science Society of America. Madison, Wisconsin.
 Stringfield, G.H. Maize Inbred Lines of Ohio, Ohio A.E.S. Bul. 831. 1959.
 Butler, D.R. 1954 - A System for the Classification of Corn Inbred Lines - PhD. Thesis, Ohio State University.

COMMENTS:

$$GDD = \frac{T_{max} \times T_{min}}{2} - 50^{\circ} F$$

$$T_{max} \leq 86^{\circ} F$$

$$T_{min} \geq 50^{\circ} F$$

Exhibit D

'LH93' is shorter than 'B77' in both plant and ear height.

'LH93' is lighter green in color than 'B77'. Using Munsell Color Charts for Plant Tissues as a reference 'LH93' would be classified as 5GY 4/6 and 'B77' would be classified as 5GY 6/6.

'LH93' differs from 'B77' in that it reaches 50% pollen and 50% silk, 88 and 78 heat units, respectively, earlier than 'B77'.

'LH93' has a strong two ear tendency and excellent standability as an inbred. 'B77' does not have a strong two ear tendency. In the fall 'B77' showed stalk lodging while the 'LH93' did not.

Exhibit E

Statement of the Basis of Application Ownership.

Holden's Foundation Seeds, Inc. Williamsburg, Iowa, believes it is the sole owner and breeder of the 'LH93' field corn inbred for which it solicits a certificate of protection.